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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 21

Application Number: 08/250,770

Filing Date: May 27, 1994

Appellant(s): Kim

Robert E. Bushnell

For Appellant

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EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed February 10, 1997.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1-24.

Claim 5 has been amended subsequent to the final rejection.

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(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

The amendment after final rejection filed on October 12, 1996 has been entered.

The amendment after final rejection filed on February 5, 1997 has been entered.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is substantially correct. The changes
are as follows:

There is no issue regarding allowability under 35 U.S.C. § 112, second paragraph to be considered, in view of entry of the amendment filed February 5, 1997 which overcomes the rejection under 35 U.S.C. § 112, second paragraph.

An additional issue to be considered, referred to as "Issue 1" in the "Response to argument" section below, is whether Figs. 2A-2D are prior art. The remaining issue, correctly noted by Appellant, is referred to as "Issue 2" below.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1, 5, 7 and 11 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

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The rejection of claims 1-4, 6, 9, 12-15 and 24 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

The rejection of claims 7-8, 10 and 17-23 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

The rejection of claims 5 and 16 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) *Claims Appealed*

A substantially correct copy of the appealed claims appears on pages 24-30 of the brief, labeled "X. APPENDIX", i.e. the second Appendix to the appellant's brief. The minor errors are as follows: the copy of the claims is not an entirely "clean copy", as it includes labels such as "(Amended)" and "(Twice Amended)". The text of the claims is otherwise clean. This is deemed to be a minor error not requiring correction.

(9) *Prior Art of Record*

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

Prior Art as illustrated in Figs. 1 and 2A-2D of the instant application.

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4,918,462	Tomita et al.	4-1990
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4,989,039	Hayashi et al.	1-1991
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(10) New Prior Art

No new prior art has been applied in this examiner's answer.

(11) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-24 are rejected under 35 U.S.C. § 103 as being unpatentable over the Applicant's admitted prior art in FIGS. 1, 2A-2D in view of Tomita et al. and Hayashi et al. 4,989,039.

The admitted prior art teaches data transmitting means 10, printing control means 20, means 40 for generating a local clock signal, means 50 for generating a first clock signal by dividing the local clock signal, data bus means 2, beam scanning means 30. The admitted prior art apparatus differs from the claimed invention by lack of a chopping means/logic means, mode selecting means/means for setting a frequency exhibited by said second clock signal in dependance upon a dividing ratio component of image data, second clock signal and second means for generating said second clock signal by dividing the local clock signal in dependance upon a dividing ratio component of image data, clock signal generating means for generating a first clock signal and for generating a second clock signal, and the particular relationship of first clock signal frequency and second clock signal frequency.

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Tomita et al. disclose a chopping means (3), mode selecting means (pulse selection input to pulse signal selection circuit 7) and second means for generating said second clock signal by dividing the local clock signal in dependence upon a dividing ratio component of image data (pulse signal generating circuit 6, including clock 11 and dividers 17 as illustrated in Fig. 11, and pulse signal selection circuit 7).

Hayashi et al. '039 teach that it is known in the art to change a power level of a light source in an electrophotographic developing type reproduction apparatus in accordance with changes in environmental conditions, thereby facilitating provision of an image forming apparatus capable of forming an image with satisfactory tonal rendition regardless of changes in environmental conditions. However, Hayashi et al. '039 teaches varying intensity of a laser beam to vary power.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the Tomita et al. chopping means, mode selecting means and second means for generating said second clock signal with the admitted prior art apparatus. The reason for the combination is to enable change of power level of the admitted prior art light source in accordance with changes in environmental conditions, thereby facilitating provision of an image forming apparatus capable of forming an image with satisfactory tonal rendition regardless of changes in environmental conditions as suggested by Hayashi et al. '039, while avoiding variation in intensity of the laser beam.

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In the combination, the Tomita et al. clock signal (STB) is suggested to be higher frequency than the clock signal 52 from dividing unit 50 when varying power level of the laser from the level provided in the admitted prior art apparatus, since this is necessary for the different frequencies to have an effect on power level of the light source.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to generate both the first clock signal and second clock signal by dividing a same clock signal from a single generator, particularly because it is known in the art to generate different clock signals by dividing a single clock signal, as evidenced by Tomita et al.

FIG. 11. The reason for dividing from a single clock is to reduce the number of elements in the invention.

The steps of the method are deemed to be made clearly obvious by the functions of the structure of the combination discussed above.

(12) *New Ground of Rejection*

This examiner's answer does not contain any new ground of rejection.

(13) *Response to argument*

Applicant's arguments at page 6, line 16 through page 8, line 7 of the brief concerning rejection of claim 5 under 35 U.S.C. § 112, second paragraph have been considered but are moot in view withdrawal of the rejection responsive to the amendment filed February 5, 1997.

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Issue 1:

At page 8, lines 14-20 of the brief, Appellant argues that Figs. 2A-2D are not prior art because the results depicted in Figs. 2A-2D were obtained by work performed on the prior art device of Fig. 1 and because there is no showing that Figs. 2A-2D qualify as prior art under 35 U.S.C. § 102. This argument is not deemed to be persuasive. Specification page 7, line 12 through page 10, line 8 discuss Figs. 1 and 2A-2D. Specification page 9, lines 1-2 in particular indicate that Figs. 2A-2D illustrate the timing relationship of waves output from previously discussed stages illustrated in Fig. 1. Since Figs. 2A-2D are disclosed as illustrating signals generated by the prior art apparatus, they are *prima facie* prior art. Further, there is no evidence of record rebutting this *prima facie* showing.

Issue 2:

At page 9, lines 1-11 of the brief, Appellant argues that the problem confronted by the Appellant must be considered in determining whether it would have been obvious to combine references in order to solve that problem. This argument is not deemed to be germane to the issue because the references in the combination are not combined to solve the problem confronted by the Appellant. Further, the references may suggest doing what Appellant has

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done even though workers in the art were ignorant of the existence of the problem; *In re Gershon*, 152 USPQ 602 (CCPA 1967).

At page 9, lines 12 through page 10, line 5 of the brief, Appellant argues that one of ordinary skill would not have been motivated by Tomita et al. to modify the laser printing device of Prior Art Fig. 1 because Tomita uses an LED array whereas the Fig. 1 device uses a laser beam. This argument is not deemed to be persuasive. While Tomita does teach use of a plurality of LEDs in an LED array and does not refer to a laser, Tomita suggests power level control of a single light emitting element by chopping a data signal which is then applied to the light emitting element. Therefore the Tomita teaching is applicable to control of the single light emitting element in the Prior Art Fig. 1 device. Proper inquiry in determining obviousness should not be limited to the specific structure shown by the references, but should be into the concepts fairly contained therein. *In re Van Beckum*, 169 USPQ 47 (CCPA 1971).

At page 10, lines 6-17 of the brief, Appellant suggests that the claimed invention differs from the combination of references because the combination includes changing the bias voltage of a developer to adjust the amount of toner developed, while the claimed invention includes no language directed to this changing. However, the claims are recited as "comprising" the limitations recited therein; thus, the lack of structure or function does not distinguish from a combination of references including the structure or function. Consequently, the fact that Tomita and Hayashi are silent with respect to changing of bias

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voltage and the fact that the combination does not suggest elimination of the changing of bias voltage are not germane to the issue.

At page 10, line 18 through page 11, line 2 of the brief, Appellant suggests that the claimed invention has an advantage of enabling the user to adjust the density of printed images without adjusting the bias voltage of a developing unit. In response, it is noted that the combination also enables such adjustment. Density is suggested to be changeable by provision input of appropriate signals through a mode selection switch external of the apparatus (see Hayashi column 3, lines 30-35).

At page 11, lines 3-13 of the brief, Appellant argues that Hayashi does not suggest using Tomita in order to modify the laser printing device of Prior Art Fig. 1 and does not suggest adjusting density in the Prior Art Fig. 1 device by chopping of data. In response, it is noted that the test for obviousness is not what the individual references themselves suggest but rather what the combination of the disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin*, 170 USPQ 209 (CCPA 1971). One cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the combination, Tomita clearly suggests the chopping of data to control power level and Hayashi suggests controlling power level to control density in response to environmental conditions. Tomita is

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applied to facilitate the control of power level suggested by Hayashi without change of laser beam intensity.

At page 11, lines 7-9 of the brief, Appellant argues that Hayashi does not suggest that varying of the current to the laser device is an alternative to changing the bias voltage of a developer to adjust the amount of the toner developed. This argument is not deemed to be germane to the issue because the rejection does not propose substitution of varying of current for changing the bias voltage of a developer and does not suggest that the two are equivalent, and, as noted above, changing the bias voltage of a developer to adjust the amount of the toner developed is not found in the claims.

At page 11, line 14 through page 12, line 9 of the brief, Appellant argues that there is no factual evidence that there is a problem with Prior Art Fig. 1 with regard to forming an image with satisfactory tonal rendition due to changes in environmental conditions. In response, Hayashi suggests that, without adjustment, changes in environmental conditions result in deterioration of tonal rendition in an apparatus which develops toner images. Since the Prior Art Fig. 1 device develops toner images and includes no adjustment in response to changes in environmental conditions, it possesses this problem. While a user may manually adjust for changes in tonal rendition in the Prior Art Fig. 1 device due to changes in environmental conditions, the device, by itself, is incapable of adjusting for such changes. Thus, a problem exists in the Prior Art Fig. 1 with regard to forming an image with satisfactory tonal rendition due to changes in environmental conditions, namely that the device

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is incapable of providing satisfactory tonal rendition due to changes in environmental conditions.

At page 12, line 10-17 of the brief, Appellant argues that since Prior Art Fig. 1 already adjusts toner development, which could have been due to environmental conditions, then there is no teaching that applying Hayashi is necessary. As discussed above, the Prior Art Fig. 1 device does not adjust toner development. Toner development adjustment in the Prior Art Fig. 1 device is *only* disclosed as being performed manually and there is no teaching as to how to automate the Prior Art Fig. 1 toner adjustment.

At page 12, line 17 through page 13, line 7 of the brief, Appellant argues that the combination of Hayashi with the Prior Art Fig. 1 device would suggest automatic adjustment of the bias voltage since Hayashi does not teach or suggest that varying the current to the laser device is an alternative to, or better than, changing the bias voltage of a developer to adjust the amount of the toner developed. Contrary to Appellant's position, Hayashi clearly suggests varying the current to a laser device to adjust toner development to adjust for environmental changes and includes no suggestion of automatic adjustment of the bias voltage to adjust toner development, and Prior Art Fig. 1 includes no suggestion of automatic adjustment of the bias voltage. Consequently, the element suggested to be automatically adjusted in the combination is the laser device, not the bias voltage of the developer.

At page 13, line 8-17, Appellant argues that one of ordinary skill would not have had reason to look to Tomita for a solution to the apparent problem of forming an image with

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satisfactory tonal rendition due to changes in environmental conditions because Tomita is silent with regard to the "problem with forming an image with satisfactory tonal rendition due to changes in environmental conditions." This argument is not deemed to be germane to the issue because the rejection does not suggest that Tomita either teaches this problem or solves this problem. Tomita is cited simply to provide teaching of varying power level of a light emitting element without variation of intensity.

Appellant's arguments at page 13, line 18 through the sentence ending at page 14, line 20 of the brief are deemed to be fully addressed by the rejection and response presented above.

At page 14, line 20 through page 15, line 2 of the brief, Appellant argues that no reason beyond hindsight reasoning has been indicated as a reason for applying the teaching of Tomita. In response, it is noted that Tomita is applied to avoid variation of laser beam intensity. Both the Tomita and Hayashi apparatus change power of a light source, where Tomita changes the power level by chopping pulses and Hayashi changes power level by changing applied current. Thus, the two power sources are clearly equivalent for changing a power level of a light beam in a recording apparatus, each possessing its own advantages which are readily apparent to those of ordinary skill in the art; e.g. pulse width modulation techniques such as chopping pulses to change power level do not cause difficulty obtaining linear reproduction and intensity modulation techniques such as changing applied current forms images of constant resolution.

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At page 15, lines 3-11 of the brief, Appellant argues that the combination fails to teach or suggest chopping means for providing chopped data by dividing the converted data from said data transmitting means in accordance with a second clock signal. In Tomita, data is provided to one input of an AND gate from shift register 4 and a clock signal is provided to another input of the AND gate from clock 11a and a frequency divider 17a selected by selection circuit 7, resulting in a chopped signal as illustrated in Fig. 5. In the combination, the AND gate receives the data from the data transmitting unit and clock signal from the Tomita structure in the combination. The fact the Appellant illustrates timing diagrams while Tomita does not is without consequence, as the signals AND gate has the same effect whether or not its effects are illustrated. Accordingly, the combination is deemed to suggest the argued limitation.

At page 15, lines 12-17 of the brief, Appellant argues that the combination fails to teach or suggest mode selecting means enabling a user to change a characteristic of said second clock signal. In response, it is noted that the claimed "mode selecting means" corresponds to an input to a divider which accepts a signal from a data output device which accepts user selections, and equivalent structure thereto in accordance with 35 U.S.C. § 112, sixth paragraph. The divider divides an applied clock signal and generates a particular frequency signal depending on the signal from the data output device applied to the input, the applied signal being disclosed as a "dividing ratio component"; this dividing ratio component is disclosed in Appellants specification simply as being provided by a data output device "in

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accordance with the selection by the user and the printing data"; see page 12, line 3 through page 13, line 11. In the combination, Hayashi suggests data and signals may be provided in accordance with user selection at column 3, lines 25-35 and the Tomita structure, particularly including the dividers and pulse selection circuit which generates a selectable frequency output depending on a pulse selection signal, is equivalent to the divider with selectable frequency output. Thus, the Tomita structure in combination, which is capable of receiving signals in accordance with user selection, is deemed to be equivalent to the claimed mode selection means.

At page 15, line 18 through page 16, line 5 of the brief, Appellant argues that the combination fails to teach or suggest second means for generating said second clock signal by dividing said local clock signal in response to a dividing ratio component accompanying said input data. In response, the Tomita structure in the combination is clearly a second means for generating said second clock signal by dividing said local clock signal in response to a dividing ratio component, wherein Tomita clock 11 generates the second clock signal and dividers and pulse generating circuit generate a divided signal in accordance with a dividing ratio component, and wherein the pulse selection signal is the dividing ratio component. Further, the pulse selection signal which is suggested as being provided in accordance with environmental conditions at the time data is applied to the combination is deemed to accompany the data and to be a component of the input data. Thus, the combination does

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suggest second means for generating said second clock signal by dividing said local clock signal in response to a dividing ratio component accompanying said input data.

At page 16, line 6-12 of the brief, Appellant argues that none of the applied references teach or suggest converting data into a series of pulses exhibiting a pulse frequency corresponding to the frequency of the second clock signal. Contrary to Appellants' position, Tomita clearly converts data from shift register 4 into a series of pulses exhibiting a pulse frequency corresponding to the frequency of the clock signal provided by the pulse signal selection circuit, which, in the combination, is the second clock signal.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



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